Course: Physics 495
Term: Fall, 2020
Teaching Mode: Remote only, synchronous and asynchronous
Class: MWF, 8:30-9:25am

Instructor Contact Information

Instructor: Randall Hulet
Office: BRK 391
Email: randy@rice.edu
Office Hours: By appointment; feel free to contact the instructor at any time

Course Objectives and Learning Outcomes

Physics 202 is an introductory course in special relativity, quantum mechanics, and statistical physics. The course is descriptive in nature with emphasis on phenomena rather than on detailed calculations. Students are expected to learn concepts in order to solve homework and exam problems. Physics 202 is a required course for physics majors but is also appropriate for students looking for an introduction to Modern Physics. Physics 201 (Waves and Optics) is not a prerequisite, but it is helpful to be familiar with its content. You should have taken, or be taking concurrently, differential equations and vector calculus.

Required Texts and Materials

"Modern Physics (2nd Edition)", by Randy Harris

Exams and Papers

There will be a homework assignment due approximately every week, and a mid-term and a final exam.

Grade Policies

Grades will be based on weekly problem sets (30%), mid-term exam (30%), final exam (35%), and contributions to the classroom (5%). Lectures will be supplemented with in-class problem sessions led both by the Professor and the students. Homework and exam solutions will be posted to Canvas.

You are encouraged to work together on problem sets as discussion can be very helpful in learning concepts that are sometimes counterintuitive. However, copying a solution from any source, including your classmates, material from previous years, or an answer book, is not helpful and is a violation of the honor code. The exams will be open text book and notes, but are to be done independently.

Late Homework Policies

Problem sets are due at 8:30 am on the due date. Makeups for missed homework or exams will be handled on a case-by-case basis. If you must miss an exam or assignment due to university business, let the instructor know before the exam or due-date for the assignment. If an unexpected circumstance arises, such as an illness or death in your family, let the instructor know as soon as possible.

Rice Honor Code

All students will be held to the high standards of the Rice Honor Code. If you are unfamiliar with the details of this code and how it is administered, you should consult the Honor System Handbook at http://honor.rice.edu/honor-system-handbook/.

DISABILITY SUPPORT SERVICES

Any student with a disability requiring accommodations in this class is encouraged to contact the instructor outside of class early in the semester. Additionally, students should contact the Disability Support Services in room 111 of Allen Center (adarice@rice.edu).

COURSE TOPICS (THESE FOLLOW THE CHAPTERS IN HARRIS)

1, 2. Special relativity (~6 lectures)

3. Quantum theory of light (~4 lectures)
4. Origins of the quantum theory of matter (~4 lectures)
5. 1-dimensional bound states (~4 lectures)
6. 1-dimensional unbound states (~5 lectures)
7. 3-dimensional quantum mechanics (~4 lectures)
8. Spin and multi-electron atoms (~4 lectures)
9. Statistical physics (~3 lectures)
10. Molecules, solids, and superconductivity (~3 lectures)
11. Nuclear physics (~3 lectures)